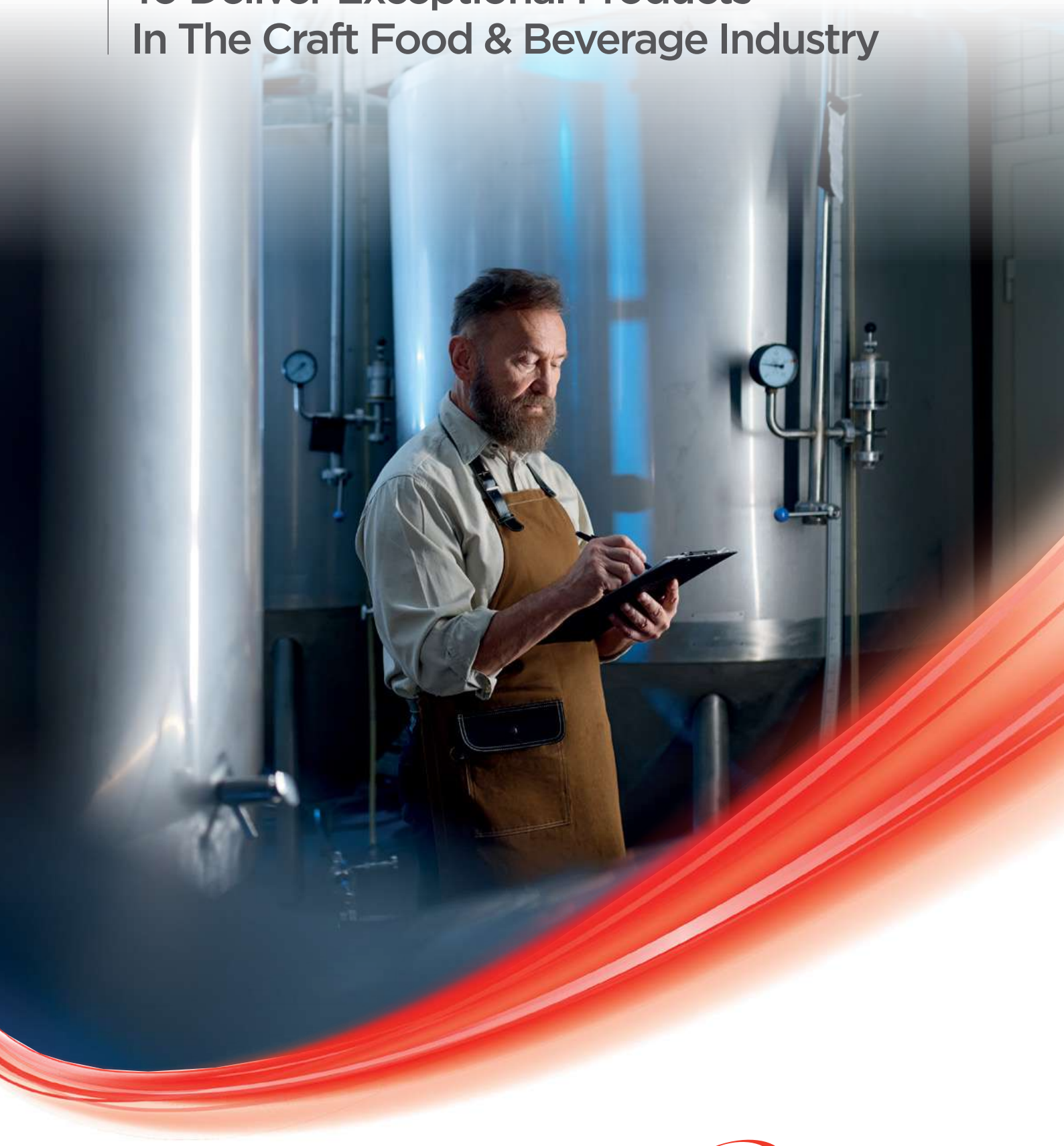
INGERSOLL RAND WHITE PAPER | OCTOBER 2024

Optimising Air Quality To Deliver Exceptional Products In The Craft Food & Beverage Industry



Ingersoll Rand

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Introduction

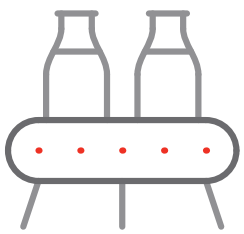
The craft food and beverage industry, which handcrafts small batches of beer, wine, food, snacks and desserts, has grown in epic proportions over the last few years. The beauty of this industry is producers have a deep understanding of their customers, using traditional methods and natural ingredients in a simple yet skilled way to create unique artisan products.

Most restaurants, taprooms, coffee shops, grocery stores, and other food locations usually have some sort of craft food or beverage that specifically belongs to that location. These products attract customers because they are not only considered healthy and organic but also make the customers feel like they are supporting local establishments.

Since being handcrafted locally and made with the very best and freshest ingredients, minimising the risk of food and drink contamination during production is crucial. This is where we come in! Due to the constant presence of compressed air in craft food and beverage production, the first step to managing contamination risk is to ensure optimal air quality by using a high-quality, efficient compressed air system.

In This White Paper, You Will Learn:

- The uses of compressed air for craft food and beverage production
- How to optimise air quality to deliver exceptional products in the craft food and beverage industry
- How to select the right air compressor and the solutions we have available to you
- How to find service and maintenance programs that optimise the total cost of ownership



Compressed Air In The Craft Food And Beverage Industry

Compressed air has a multitude of uses in the craft food and beverage industry. From spraying oil or dispensing liquids such as soft drinks, condiments, and beer to producing ozone to treat water or generate nitrogen to create nitrogenised beer, compressed air is everywhere! Compressed air can be used directly on food as an air knife or on packaging for agitation, transfer or sealing. It's even used for things like sorting, moving, peeling or cutting products; filling pastries; cooling, freezing and mixing products; creating, filling and cleaning packaging; as well as maintaining the cleanliness of your facility. The closer the compressed air comes to contacting the product, the more important mitigating risk becomes.

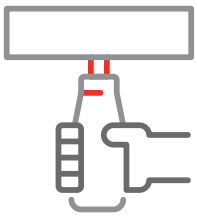
Mitigating Risk In The Craft Food And Beverage Industry

Craft food and beverage producers must factor in certain risk management efforts when determining the appropriate compressed air equipment for their manufacturing requirements. Mitigating risk by following preventative safety measures helps to create an environment that anticipates low-risk potential hazards, with the goal of prevention or elimination. The goal of all craft food and beverage producers is to provide products for the consumer that are reliably safe and free from the contamination of chemicals, oils, water, particulates and biological mass, like mould, fungus, viruses, bacteria and prions.

Because there is no stipulation made by global standard organisations in the craft food and beverage industry regarding the type of compressors that must be used, both oil-free and oil-flooded systems can be considered when determining what's best for your application. The determining factor will be if compressed air comes into direct contact with your product or if it is used in a part of your facility where it doesn't come into contact with your product. Other considerations here are your budget and how much risk you're willing to take! The most important thing is that the system you choose is able to produce high-quality, food-grade air that eliminates consumer risk.

There will be more about this later, though. Let's first take a closer look at the applications that rely on compressed air in craft food and beverage production.

Applications That Rely On Compressed Air In Craft Food And Beverage Production



Preparing & Producing Products:

Compressed air has a multitude of uses when it comes to preparing and producing craft food and beverages. From the use of high-pressure jets to remove peels and shells or slice products to mixing dry ingredients without damaging them, high-quality compressed air is vital! Other uses include filling items to ensure even distribution, as well as cooling and freezing.

As these processes may involve contact between compressed air and your ingredients, the supply of air you use for preparing and producing must be of high quality. Class 0 air here may be the ideal choice, as air quality is uncompromisable to ensure consumer and product safety. But how can you achieve Class 0 air? Well, it all starts with choosing the right equipment, and an oil-free or oil-flooded air compressor would do the trick here. However, the emphasis needs to be on an effective downstream system equipped with a reliable filtration system, compressed air dryer and condensate management unit. This way, you can ensure your air stream is 100% free from oil and other contaminants, allowing you to ensure optimal air quality.

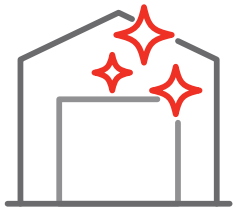
Packaging Products:

When it comes to packaging craft food and beverage products, compressed air is equally as important. From ensuring the packaging is clean to vacuum sealing containers or generating nitrogen to fill packets, compressed air is required at every stage of the process. Again, as with preparing food and beverages, high-quality food-grade air is essential to eliminating health and safety risks, so air treatment equipment is also vital here!

Brewing, Carbonation, Bottling & Canning:

When it comes to artisan beers or soft drinks, compressed air has many uses, including aeration, filtration, and kegging for brewing, dissolving carbon dioxide into liquids to create fizz, and powering the machinery that fills, seals, and packages the beverages. Ensuring a high-quality stream of air here is also incredibly important as it is typically a contact application, which means that the compressed air may come into contact with the final product.

Here, as with preparing and processing craft food and beverages, an air treatment system would be invaluable, as it would help to remove moisture and other contaminants from your compressed air. This is because moisture, in particular, is not only a contaminant but also wreaks havoc on any air-powered or pneumatic machinery your processes require. This is because it can lead to rusting and corrosion, which accelerates equipment degradation. This means that not only does moisture interfere with your air quality and final products, but it can also decrease workplace safety and efficiency by making equipment faulty and unreliable. Don't worry, though; it's a fairly straightforward fix! All you need to remove moisture from your compressed air is a dryer! Refrigerated dryers would be a good choice here, as they effectively remove moisture whilst also reducing energy consumption and minimising air loss, allowing you to operate more efficiently.



Ensuring Facility Cleanliness:

Compressed air is also used in the craft food and beverage industry to keep your facility clean. Typically, this involves using an airflow to blow away food debris.

Removing The Pain Points

How To Optimise Air Quality And Efficiency To Deliver Exceptional Products In The Craft Food And Beverage Industry

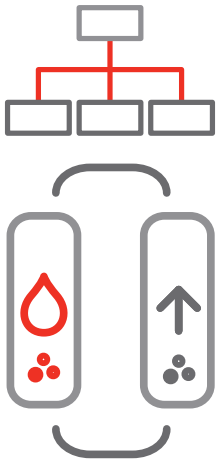
1. IMPLEMENTING THE RIGHT COMPRESSED AIR EQUIPMENT

Using the wrong compressed air equipment in your craft food and beverage facility can have detrimental impacts on efficiency, air quality and product quality, which can increase consumer risk and skyrocket your costs. This is why choosing the right equipment for your exact craft food and beverage processes is so important, particularly when it comes to contact and non-contact applications. We explain more about this in the Sizing Up Your Needs section of this White Paper, where we discuss how to choose the right compressed air equipment for your particular application and give you a closer look at our available portfolio. Adapting your equipment to market changes is also important, but it can be costly, so choosing energy-efficient, tried-and-tested designs is the best way to go, as they're more likely to keep up with industry shifts. This is where Ingersoll Rand can help!

2. OIL SAMPLING

As mentioned, high-quality, clean, oil-free air plays an essential role in a large proportion of craft food and beverage production processes. To ensure optimal air quality, an assessment called oil sampling can be carried out in your facility. This process analyses any internal or external contamination that may impact your compressed air system. By assessing the inner workings of your compressed air network and its ambient conditions, you can gain vital insights into any factors that may be impacting or compromising the quality of your system's oils and lubricants. Oil sampling will also give you an overview of the current condition of your compressor's components. Identifying any issues or inconsistencies with your oil in this way is essential to ensure efficient performance and optimal air quality. This process is vital for ensuring air quality for both contact and non-contact craft food and beverage applications.

Frequent lubricant changes are also recommended for craft food and beverage production to eliminate the risk of product contamination and spoilage, as well as to ensure the cleanliness of your equipment. They are also important to ensure your oil is meeting the safety and quality standards of the craft food and beverage industry.



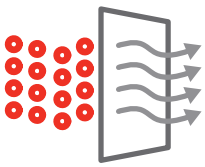
3. AN EFFECTIVE DOWNSTREAM SYSTEM

To eliminate the risk of any contamination in your compressed air system, an effective downstream system is essential to mitigate risk and ensure consumer and product safety. This consists of 3 vital components:

Dryers:

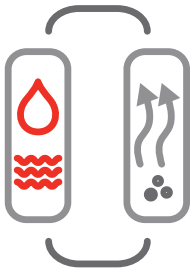
The first key component of any effective downstream system is a compressed air dryer, whose job it is to eliminate any moisture from your compressed air. This is vital to achieving food-grade air, as moisture can contaminate your products. Moisture, as mentioned, can also wreak havoc with any pneumatic or air-powered processing or packaging equipment you use, as it can cause rusting and corrosion. This can lead to workplace safety risks, as it makes equipment faulty and unreliable. Therefore, clean, dry air is vital to ensure both employee and customer safety.

There are a variety of compressed air dryers on the market, including desiccant dryers, which offer ultra-dry, high-quality air at a lower pressure dew point, and refrigerant dryers, which are well suited for most general applications. If you want to utilise wasted compression heat, there are also heat of compression (HOC) dryers. There are also lots of energy-saving dryers on the market to help you operate more energy and cost-efficiently.



Filtration System:

Another essential component of any effective downstream system is a highly efficient filtration system that can remove contaminants and impurities such as oil, dust, moisture and other particulates from your compressed air. As mentioned, this is important for powering any pneumatic or air-powered production and processing equipment, as this typically requires ISO-certified Class 0 air. By implementing a filtration system, you can achieve optimal air quality whilst also eliminating any of the inefficiency that substandard air can cause.

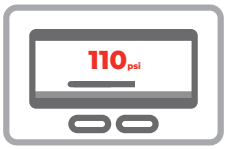


Condensate Management & Treatment:

Condensate is a natural by-product of compressing air, but due to the mixture of oil and water it creates, it is typically considered hazardous industrial waste. Therefore, the safe and environmental management and removal of condensate is essential. The most effective way to deal with condensate is to implement a condensate management unit that contains condensate or zero-loss drains. These drains will transfer the condensate into an oil water separator, a fundamental piece of equipment that separates out the oil from the water. Condensate and zero-loss drains are typically equipped with timers, which will then remove the condensate from your oil water separator and out of your compressed air system. This can then be disposed of in a manner that adheres to strict industry and environmental regulations. Condensate removal is crucial to ensure high-quality compressed air, which is essential for both contact and non-contact craft food and beverage applications.

4. HEAT RECOVERY FOR COST-SAVING EFFICIENCY

Not necessarily related to air quality, but more the overall cost and energy efficiency of your craft food and beverage facility is the potential for heat recovery. As we know, heat is a natural by-product of the air compression process, but did you know that up to 90% of the wasted heat generated by your compressed air system can actually be recovered and redistributed? By implementing a reliable heat recovery system, you can repurpose wasted heat to heat your facility or any process water you may need. This will help to keep your costs down and operate more efficiently and sustainably.



5. MANAGEMENT & MONITORING FOR PEACE OF MIND

Unfortunately, understanding your compressed air system can often feel like a bit of a guessing game, which is why correctly monitoring and managing it is such an easy way to maximise your efficiency and keep an eye on your air quality. This enables complete peace of mind that your system is doing what you need it to.

Compressor controllers are one solution here, as they allow you to efficiently adjust pressure and flow rates to prevent inefficiency and wasted energy. Many of the applications in your craft food and beverage production facility will require pressure at varying levels, but the more pressure you need, the more energy you consume, and the more your costs will go up. This is why a compressor controller would be ideal: to ensure you are operating efficiently and only using what you need when you need it!

At Ingersoll Rand, we also offer a 24/7 remote monitoring solution that provides optimal visibility into your system. This allows you to monitor your efficiency and air quality and deal with any inefficiencies or issues before they become downtime. This solution is discussed more in the Service and Maintenance part of this White Paper.

6. WARRANTIES, OEM PARTS & MAINTENANCE

Understanding the warranties, OEM parts and accessories, and maintenance plans available to you is vital to protecting your investment and preventing unnecessary costs. This will also help you optimise air quality and efficiency, as a well-looked-after compressed air system is essential to maintaining standards. In the Service and Maintenance section of this White Paper, you can discover more about our suite of CARE™ maintenance plans. When discussing the options available with our partners, we place particular emphasis on discovering more about their exact application requirements in order to better align one of our plans with their industry needs. Whether you are in need of total asset management, a warranty, remote monitoring, OEM parts and accessories, or scheduled predictive maintenance, we have all the experience and tools to provide you with the services you need!

Sizing Up Your Needs - Ingersoll Rand's Portfolio Of Craft Food And Beverage Solutions

Choosing The Right System Is Crucial

Choosing the right compressed air system is an important decision in the craft food and beverage industry due to the risk of incidental contact with products, as well as the equipment surface they are prepared on. There is little room for error, and producers must be diligent about their production processes so that contamination doesn't occur. Every decision you make when purchasing your next compressed air system must protect the consumer, as making sure you choose the right system for your specific application is crucial to eliminate the threat of air-based contamination and protect consumer health. High-quality compressed air systems also help to ensure operational efficiency by eliminating product spoilage, product recalls, unscheduled downtime and liability.

Before purchasing a compressor, there are several things to consider, as it's important to ask yourself some key questions to ensure you are choosing the right system for your exact craft food and beverage applications. Our compressed air experts have formulated a list to get you started...

Risk Mitigation

- Does compressed air come into contact with my product?

Compressor Technology

- How much airflow is required?
- How many hours will the compressor operate each day?
- Will the flow demand fluctuate?
- Are there any space constraints?
- What are the pressure requirements?
- Is noise a concern?

Air Quality

- How clean or dry does my air have to be?
- Which filters or dryers do I need?

Systems Approach

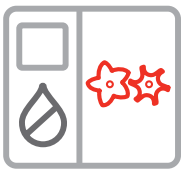
- Are you going to expand your operation in the future?
- Will generating nitrogen in-house save me money?
- Do I need external help with parts and maintenance?

Once you answer these questions, you should be well on your way to deciding which compressor is right for you.

Our Compressed Air Portfolio

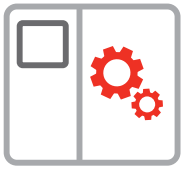
Contact vs. Non-Contact Applications:

Whether compressed air comes in contact with your product makes a big difference in air purity requirements and contamination risk. It also affects whether you should use an oil-free or oil-flooded compressor. Typically, for contact applications, an oil-free system may be more beneficial, as there is no oil in the compression chamber, making the risk of oil passing downstream virtually non-existent. They also operate at an air temperature of about 204ºC, which limits the viability of contamination by creating a hostile environment for any biological contaminants in the ingested air. By contrast, oil-flooded compressors use built-in separators and downstream filters to remove oil. Food-grade lubricants also help to ensure oil-free air. The purchase cost for oil-flooded solutions is relatively low, making them a good choice for non-contact applications. However, they require more maintenance and constant system monitoring to ensure consistent, contamination-free air.



Oil-Free Compressors:

We offer an extensive range of oil-free air compressors from 4 kW to 355 kW, ideal for producing a consistent flow of oil-free, food-grade air to power your operations. An example of one of our expert oil-free solutions is the **E-Series 15 - 37 kW (20 – 50 hp) Rotary Screw Compressors** which thanks to their completely oilless design guarantee 100% Class 0 oil and silicone-free air. Renowned for their low cost of ownership, enhanced reliability with a robust design and maximised uptime, they're ideal for maximising the efficiency of your craft food and beverage facility. The huge turndown range of the variable speed models make them an ideal solution for applications with highly fluctuating air demand, as it is for example the case in many breweries.



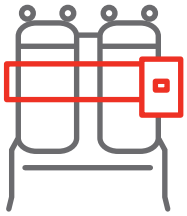
Oil-Flooded Compressors:

When it comes to oil-flooded compressors for craft food and beverage production, we have quite a few choices available, including different air compressor technologies, such as rotary screws from 7.5 to 355 kW and aluminium pistons. All of our oil-flooded models have been designed to optimise your facility's performance with high efficient solutions while offering unmatched reliability, productivity, and quality.

Food-grade lubricant is also important here to ensure your oil-flooded compressor is achieving optimal air quality. At Ingersoll Rand, we offer the **FDA-approved Ultra FG Synthetic Lubricant** that complies with USDA h1-F and FDA 21-CFR standards and should be Kosher Pareve and Halal certified. This innovative antimicrobial lubricant reduces risk by providing a unique varnish-free operation that helps to eliminate contaminant build-up like foam, sludge, varnish and acid formation inside your machine.

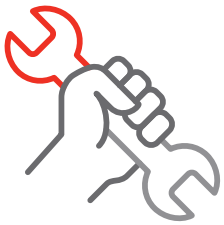
Air Treatment:

At Ingersoll Rand, we offer a wide portfolio of air treatment and downstream equipment, including high-performance filtration systems, condensate management units and drains, and oil-water separators. Regarding dryers for craft food and beverage production, we'd recommend our **Non-Cycling Refrigerated Dryers** and the game-changing **R513A Energy Saving Dryers**. Both of these dryers guarantee optimal quality and clean and dry compressed air for your craft food and beverage processes. They also offer unmatched cost and energy efficiency and savings.



On-Site Nitrogen Generation:

Nitrogen is required for some craft food and beverage processes, which is why we also offer efficient, user-friendly systems for small to medium-nitrogen generation. These solutions are ISO-certified and boast a space-saving design and optimised cost of ownership.



Service And Maintenance Programs

There are many applications in which you will require high-quality compressed air in your craft food and beverage production facility. You also now understand how to build a compressed air system that optimises your air quality and efficiency to enable you to deliver exceptional products. Now it's time to look at how to service and maintain your equipment to avoid unplanned, unbudgeted downtime and production interruptions.

Lower cost of ownership, quality results, increased uptime, and efficient energy use all add up to peace of mind.

PackageCARE™: We Protect You

- The greatest value for asset management
- Transfer operational risk for up to 10 years
- Includes all scheduled maintenance
- Predictive and analytical tools prevent production interruptions

PlannedCARE™: We Help You

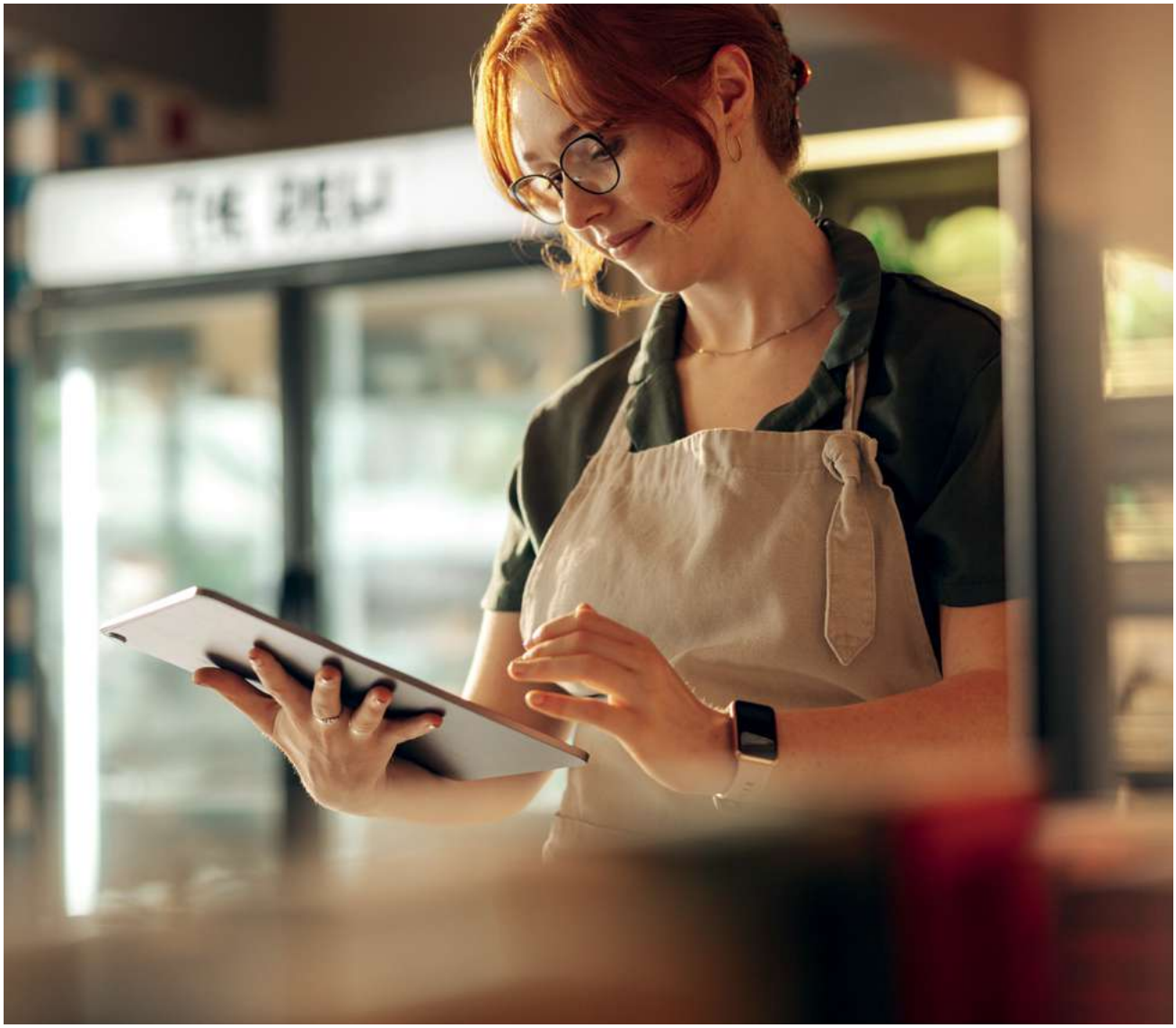
- Predictive, on-time planned maintenance
- Preventative diagnostics to catch potential problems
- Up to five-year coverage on major airend components in new rotary compressors

Performance Services

Our performance services include electronic, air leak, and system assessments. Whether you need to manage costs, increase reliability, or plan for future growth, our portfolio of assessment tools provides you with detailed diagnostics that give you the proper insights to help lower the total cost of ownership.

System Automation

System assessments often identify waste caused by a lack of adequate controls. Our suite of system automation solutions lowers energy costs and stability pressure.



24/7 Remote Monitoring With The Helix™ Connected Platform

Developed to maximise uptime and peace of mind, the Helix™ Connected Platform from Ingersoll Rand gives you real-time monitoring that provides visibility into machine functionality and equips you to operate at maximum efficiency. Your team will have direct access anytime to Helix™ insights and diagnostic reporting that can help prevent lost productivity from unforeseen breakdowns. Maintenance scheduling is simplified thanks to proactive service reminders and automated communications that help to preserve machine health.

Reliability For Life

- Generate air in any environment. We offer solutions that operate indoors and outdoors in compact spaces and extreme temperatures.
- Enjoy increased oversight with controls you can access remotely. Regulate your air use with compressor controls that monitor critical operating parameters and adapt the system to prevent downtime.
- Designed for easy serviceability and maintenance, our compressors minimise the total cost of ownership.
- An extensive catalogue of OEM genuine consumable and replacement parts is available to you to make service and maintenance easy and cost-effective. Genuine OEM parts guarantee a perfect fit and function to the highest quality standards.

Protect Your Investment With Ongoing Preventative Maintenance

When it comes to compressed air for craft food and beverage production, original equipment manufacturer (OEM) parts are an operator's best choice to maintain maximum reliability and performance. Non-standard parts can expose equipment to unnecessary wear and tear, leading to downtime and higher operating costs.

If you want to protect your investment and the performance and longevity of your equipment, make sure to invest in quality parts to keep it running. Ingersoll Rand has a complete offering of maintenance and OEM-quality compressor parts, including lubricants, maintenance kits, replacement parts, filtration and condensation management, complemented by the expertise to keep your craft food and beverage facility running.

PartsCARE™

Find A Partner You Can Trust...

Ingersoll Rand is your trusted partner for the long haul. We take a systems approach, providing expert services that go beyond providing just a compressor. Our services include skilled project management, installation for start-up, system expansion or decommissioning, as well as flexible maintenance programs that meet your specific requirements. We work with you to enhance your operation's compressed air equipment, running consultations, as well as maintaining your system to ensure that it runs at peak performance. Our main goal is to offer you the highest efficiency and quality while supporting your business with the very best equipment, accessories and service repair at the lowest possible cost.

Global Service and Support Network

Renowned for its market-leading reliability, quality, and untroubled performance, Ingersoll Rand brings over 160 years of innovative solutions to the compressed air market. In addition to a comprehensive portfolio of best-in-class air compressors, Ingersoll Rand offers various maintenance programs as well as air compressor repairs that use OEM genuine components.

Depending on your craft food and beverage facility's needs, Ingersoll Rand offers a range of service packages, from a comprehensive service program that takes the operational risk away from the customer. We also offer a simple package that includes delivering the right part to you at the right time. Choosing the right package that provides the best, most efficient support to keep your business up and running requires careful consideration. To save our customers' time, our engineers will perform a deep analysis to help determine which maintenance plan is the best for your specific industry and application needs.

It All Adds up to Peace of Mind

Lower Cost of Ownership

Our service programs provide the most cost-effective solutions based on your customised maintenance strategy.

Quality Results

Ingersoll Rand factory-trained service technicians are backed by more than 149 years of industry experience.

Increased Uptime

Service programs help decrease unplanned downtime and costly production interruptions.

Efficient Energy Use

Peak system efficiency is achieved through properly performed maintenance and inspection.

Peace of Mind

Our world-class services will help you achieve the results you need, while you focus on what's important to your business.

There's a lot riding on the quality of your air. Let Ingersoll Rand help you get it right!

Ingersoll Rand's Wide Portfolio Of Air Compressors

Ingersoll Rand provides a wide range of high-quality, low-maintenance commercial and industrial air compressors to fit every application. Our engineers can provide you with a bespoke solution and the support you need to keep your craft food and beverage facility working at maximum efficiency.

About Ingersoll Rand Inc.

Ingersoll Rand Inc. (NYSE:IR), driven by an entrepreneurial spirit and ownership mindset, is dedicated to helping make life better for our employees, customers and communities. Customers lean on us for our technology-driven excellence in mission-critical flow creation and industrial solutions across 40+ respected brands where our products and services excel in the most complex and harsh conditions. Our employees develop customers for life through their daily commitment to expertise, productivity and efficiency. For more information, visit irco.com

ingersollrand.com

Member of Pneurop

Ingersoll Rand compressors are not designed, intended or approved for breathing air applications. Ingersoll Rand does not approve specialized equipment for breathing air applications and assumes no responsibility or liability for compressors used for breathing air service.

Nothing contained on these pages is intended to extend any warranty or representation, expressed or implied, regarding the product described herein. Any such warranties or other terms and conditions of sale of products shall be in accordance with Ingersoll Rand's standard terms and conditions of sale for such products, which are available upon request.

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